

voltage sensing units **107**, **108** are integrally arranged in a single unit. According to another example, the current sensing unit **105** and the voltage sensing unit **107**, and the current sensing unit **106** and the voltage sensing unit **108**, respectively, may be integrally arranged in respective single units.

[0165] According to the embodiment illustrated in FIG. **8**, the power system **100** comprises a first processing unit **109** and a second processing unit **110**. The functionality of the first and second processing units **109**, **110**, as described in the following, may however be provided for in one unit or entity.

[0166] The first processing unit **109** is adapted to determine a first travelling wave current in the first position **103** based on the at least one first current and the at least one first voltage sensed in the first position **103** by the current sensing unit **105** and the voltage sensing unit **107**, respectively. The second processing unit **110** is adapted to determine a second travelling wave current in the second position **104** based on the at least one second current and the at least one second voltage sensed in the second position **104** by the current sensing unit **106** and the voltage sensing unit **108**, respectively. One or both of the first and second processing units **109**, **110** may be adapted to model any distortion, attenuation and/or delay of the waveform of a wave due to propagation of the wave in the transmission line **102** by means of the propagation function.

[0167] According to the embodiment illustrated in FIG. **8**, the power system **100** comprises a third processing unit **111** to which the first travelling wave current and/or the at least one second travelling wave current as determined by the first processing unit **109** and the second processing unit **110**, respectively, are input. The third processing unit **111** is configured to estimate the first travelling wave current and/or the at least one second travelling wave current. The estimation is carried out by the third processing unit **111** being configured to apply the propagation function to the second travelling wave current or to the first travelling wave current, respectively.

[0168] According to the embodiment illustrated in FIG. **8**, the power system **100** comprises a fourth processing unit **112** to which the first travelling wave current and/or the at least one second travelling wave current as determined by the first processing unit **109** and the second processing unit **110**, respectively, are input, and also an estimation of the first travelling wave current or the second travelling wave current, respectively, as determined by the third processing unit **111**. The fourth processing unit **112** is configured to determine a first travelling wave differential current based on a comparison between the determined first travelling wave current or the second travelling wave current and the estimation of the first travelling wave current or the second travelling wave current, respectively.

[0169] According to the embodiment illustrated in FIG. **8**, the power system **100** comprises a fifth processing unit **113** to which the first travelling wave differential current is input. The fifth processing unit **113** is configured to determine a second travelling wave differential current by means of, based on the propagation function, adjustment of at least one of magnitude and phase of the first travelling wave differential current such that all modes attain equal or increasingly equal modal characteristics.

[0170] The connections between the different entities in the power system **100** as indicated in FIG. **8** by the solid

lines between the different entities may be wired and/or wireless, and one-way or two-way as appropriate, using communication techniques known in the art, for signaling e.g. data and or signals. Although some of the connecting lines drawn in FIG. **8** are one-way arrows, this does not exclude the possibility of there being two-way communication between the respective entities.

[0171] In accordance with the embodiment depicted in FIG. **8**, the power system **100** may comprise a sixth processing unit **114** to which the first travelling wave differential current, as determined by the fourth processing unit **112**, and the second travelling wave differential current, as determined by the fifth processing unit **113**, are input. The sixth processing unit **114** is configured to determine a third travelling wave differential current based on a combination of the first travelling wave differential current and the second travelling wave differential current. For example, in case each of the first travelling wave differential current and the second travelling wave differential current comprises a plurality of elements, the third travelling wave differential current may be determined by means of element-by-element multiplication of the first travelling wave differential current and the second travelling wave differential current. Each element in the first travelling wave differential current and the second travelling wave differential current, respectively, may correspond to a respective one of the plurality of conductors.

[0172] With further reference to FIG. **7**, the processing module **120** depicted in FIG. **7** may according to one example include units similar to or the same as the first to sixth processing units **109-114** depicted in FIG. **8**. However, according to other examples the processing module **120** depicted in FIG. **7** may include the functionality of the first to sixth processing units **109-114** depicted in FIG. **8** in a single or in a few units.

[0173] With further reference to FIG. **8**, the power system **100** may comprise a first clock unit **115** and a second clock unit **116** for measuring or keeping track of time. The first and second clock units **115**, **116** may for example comprise Global Positioning System (GPS) based clocks or the like. The first clock unit **115** may be configured to determine a time when the first travelling wave current was determined. The second clock unit **116** may be configured to determine a time when the second travelling wave current was determined. A time-shift function may be determined by the first processing unit **109** and/or the second processing unit **110** based on the determined time(s) and a propagation time period of a wave travelling from the first position **103** to the second position **104**, or vice versa. The estimation of the first travelling wave current or the second travelling wave current as described in the foregoing may be carried out by applying the time-shift function to the propagation function so as to obtain a time-shifted propagation function and applying the time-shifted propagation function to the second travelling wave current or to the first travelling wave current, respectively. By means of the time-shifted propagation function, the travelling time of a wave travelling between the first position **103** and the second position **104** may be compensated for.

[0174] The power system **100** may comprise a decision logic module **117** to which for example the second travelling wave differential current, as determined by the fifth process-